We claim:

1. A method for coding streaming media comprising a series of data units, the method comprising:

classifying each of the data units in the series as one of the following types of encoded data units: an independent unit, a predicted unit, and a remotely predicted unit, such that the data units in the series are organized into segments, and each segment has an independent data unit, two or more predicted units and at least one remotely predicted unit, wherein the independent data unit is a data recovery point and a random access point in the series of data units, and the remotely predicted unit is a data recovery point in the series of data units that is classified independently from the random access point and is coded with more efficiency than the independent data unit;

encoding each of the data units classified as an independent data unit in a compressed format using only information from the data unit;

encoding each of the data units classified as a predicted unit in a compressed format by encoding differences between the data unit and the immediately preceding data unit in the series; and

encoding each of the data units classified as a remotely predicted unit in a compressed format by encoding differences between the data unit and the data unit classified as the independent unit in the segment.

2. The method of claim 1 including:

encoding the series of data units as a sequence of encoded data units comprising contiguous segments, each contiguous segment starting with an encoded independent data unit, followed by predicted units that are each dependent on the immediately preceding data unit, and including at least one remotely predicted unit inserted within a sequence of the predicted units;

wherein the classifying step is performed dynamically while previously classified and encoded data units are being transmitted.

3. The method of claim 2 wherein the classifying step includes dynamically selecting a spacing of remotely predicted units in each of the contiguous segments as the encoded data units are being transmitted.

4. The method of claim 3 wherein the spacing of remotely predicted units is determined dynamically based on a priority assigned to media content being transmitted.

5. The method of claim 3 wherein the spacing of remotely predicted units is determined dynamically based on data transmission rate.

6. The method of claim 3 wherein the spacing of remotely predicted units is dynamically determined based on a measure of data loss detected in previously transmitted data units.

7. The method of claim 1 further including;

encoding the series of data units as a sequence of encoded data units comprising contiguous segments, each contiguous segment starting with an encoded independent data unit, followed by predicted units that are dependent on the immediately preceding data unit, and including at least one remotely predicted unit inserted in a sequence of the predicted units such that the predicted unit immediately following the remotely predicted unit is predicted from the remotely predicted unit;

prioritizing encoded data units for transmission such that independent data units are transmitted with highest priority, remotely predicted units are transmitted with next highest priority, and predicted units are transmitted with lowest priority.

8. The method of claim 7 wherein the series of data units is divided into portions, and the data units in each portion are prioritized such that all independent data units in a portion are to be sent first, then all of the next highest priority data units, and finally all of the predicted units, subject to available bandwidth constraints.

9. The method of claim 1 wherein the data units are video frames.

10. The method of claim 1 wherein the data units are audio frames.

11. A computer readable medium having instructions for performing the steps of
5   claim 1.

12. A method for decoding streaming media comprising a series of data units
where the data units are arranged in segments, and each segment includes an independent
data unit, two or more predicted units and at least one remotely predicted unit, the
10   method comprising:

decoding an encoded bit stream to identify the data units in the series for decoding
as one of the following types of coded data units: an independent unit, a predicted unit,
and a remotely predicted unit;

for segments of independent data units in the series, decoding each of the
15   segments, including:

decoding each of the data units classified as an independent data unit in a
compressed format using only information from the data unit;

decoding each of the data units classified as a predicted unit by decoding
differences between the data unit and the immediately preceding data unit in the series,
20   and adding the differences with an immediately preceding data unit, which has been
previously reconstructed and stored; and

decoding each of the data units classified as a remotely predicted unit by decoding
differences between the data unit and the data unit classified as the independent unit in
the segment, and adding the differences with the independent unit, which has been
25   previously reconstructed and stored; and

in an event where a predicted unit is lost, performing loss recovery with a
remotely predicted unit following the lost predicted unit;

wherein the independent data unit is a data recovery point and a random access
point in the series of data units, and the remotely predicted unit is a data recovery point in
30   the series of data units that is inserted at a location that is independent from the random
access point and is coded with more efficiency than the independent data unit.

13. A computer readable medium having instructions for performing the steps of claim 12.

14. A method for classifying data units in a media stream for prediction-based coding, the method comprising:

reading an ordered sequence of data units in an input media stream;

classifying each of the data units in the series as one of the following types of encoded data units: an independent unit, a predicted unit, and a remotely predicted unit, such that the data units in the series are organized into segments, and each segment has an independent data unit, two or more predicted units and two or more remotely predicted units, wherein the independent data unit is a data recovery point and a random access point in the series of data units, and the remotely predicted units are data recovery points in the series of data units that are classified independently from the random access point and are located closer together in the series of data units than the independent data units;

wherein each of the data units classified as an independent data unit is designated to be encoded using only information from the data unit;

wherein each of the data units classified as a predicted unit is designated to be predicted from an adjacent data unit in the series; and

wherein each of the data units classified as a remotely predicted unit is designated to be predicted from a remote, non adjacent data unit in the series, which is either another remotely predicted unit or an independent data unit.

15. The method of claim 14 wherein each segment corresponds to a segment in an ordered sequence of segments in the input media stream;

wherein each segment in the input media stream is a temporally ordered sequence of data units starting with a first data unit, and then followed by a temporally ordered sequence of data units;

wherein the classifying step classifies the first data unit in each segment as an independent data unit, and classifies each data unit following the first data unit in the segment as a predicted unit or a remotely predicted unit.

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17. The method of claim 15 wherein the remotely predicted units are classified dynamically during transmission of previously encoded data units based on a measure of data transfer reliability.

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18. The method of claim 15 wherein the remotely predicted units are classified based on a measure of available bandwidth for transferring encoded data units.

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19. The method of claim 15 wherein the remotely predicted units are classified based a user adjustable input parameter.

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20. The method of claim 19 wherein the user adjustable parameter indicates spacing of remotely predicted units in independent segments.

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21. The method of claim 19 wherein the remotely predicted units are classified based on a user definable relationship between type of media content and spacing of the remotely predicted units in independent segments.

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22. The method of claim 15 wherein the remotely predicted units are classified based on a parameter returned by a receiver of the data stream that plays a decoded version of the data stream, where the parameter provides a measure of fidelity of the playback of the data stream.

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23. The method of claim 15 wherein the remotely predicted units are classified such that the series includes two or more levels of remotely predicted units, with a first level of remotely predicted units in a segment that are each directly dependent on an I unit of the segment, at least a second level of remotely predicted units in the segment, including a second level unit that is directly dependent on a unit in the first level.

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24. A computer readable medium having instructions for performing the steps of claim 15.

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25. A method for coding streaming media comprising a series of data units, the method comprising:

classifying each of the data units in the series as one of the following types of encoded data units: an independent unit, a predicted unit, and a remotely predicted unit, such that the data units in the series are organized into segments, and each segment has an independent data unit, two or more predicted units and at least one remotely predicted unit, wherein the independent data unit is a data recovery point and a random access point in the series of data units, and the remotely predicted unit is a data recovery point in the series of data units that is classified independently from the random access point and is coded with more efficiency than the independent data unit;

encoding each of the data units classified as an independent data unit in a compressed format using only information from the data unit;

encoding each of the data units classified as a predicted unit in a compressed format by encoding differences between the data unit and an adjacent data unit in the series; and

encoding each of the data units classified as a remotely predicted unit in a compressed format by encoding differences between the data unit and a remote, non-adjacent data unit in the segment, selected as either the independent unit or another remotely predicted unit in the segment.

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26. A method for coding streaming media comprising a series of data units, the method comprising:

classifying each of the data units in the series as one of the following types of encoded data units: an independent unit, a predicted unit, and a remotely predicted unit, such that the data units in the series are organized into segments, and each segment has an independent data unit, two or more predicted units and two or more remotely predicted units, wherein the independent data unit is a data recovery point and a random access point in the series of data units, and the remotely predicted units are data recovery points in the series of data units that are classified independently from the random access point and are located closer together in the series of data units than the independent data units;

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encoding each of the data units classified as an independent data unit in a compressed format using only information from the data unit;

encoding each of the data units classified as a predicted unit in a compressed format by encoding differences between the data unit and an adjacent data unit in the

5   series;

encoding each of the data units classified as a remotely predicted unit in a compressed format by encoding differences between the data unit and a remote, non-adjacent data unit in the segment, selected as either the independent unit or another remotely predicted unit in the segment; and

10   prioritizing encoded data units for transmission such that independent data units are transmitted with highest priority, remotely predicted units are transmitted with next highest priority, and predicted units are transmitted with lowest priority.